IMAAC

Interagency Modeling and Atmospheric Assessment Center

Real World

Benzene Release at Petrochemical Depot Deer Park, TX

29MAR2019 04300Z

RFI – 19 – 0254yU

29MAR2019

Requestor: NWS – Houston WFO

9968852

Request Summary

- **Request Data**
  - Requestor: Brian Kyle, Lead Forecast Meteorologist, National Weather Service – Houston WFO
  - Contact: 1-800-846-1828, sr-hgx.ops@noaa.gov
  - Request: Downwind hazard for a benzene release in Deer Park, TX resulting from the fire which began on March 17.
- **Solution**
  - Summary: Concentration plots with distance circles are provided, based on a release with 10 ppm at the source region; an AEGL plot is provided based on a release rate of 10 kg/min
  - Employment: Real World
  - Reachback: S. Lahl, R. Lucheta

Deer Park, TX
Tank Farm:
Latitude: 29.732437° N
Longitude: 95.091517° W
Bayou:
Latitude: 29.742222 °N
Longitude: 95.10000 °W

Time: 1400 CDT
Date: 29MAR2019

Hazard:
- AEGL plot based on benzene vapor released at 10 kg/min.
- Concentration plots based on release rate adjusted to give a concentration of 10 ppm near the release.

Weather:
Concentration plots:
- Winds 150° at 12 kts, 75°F, 64% humidity

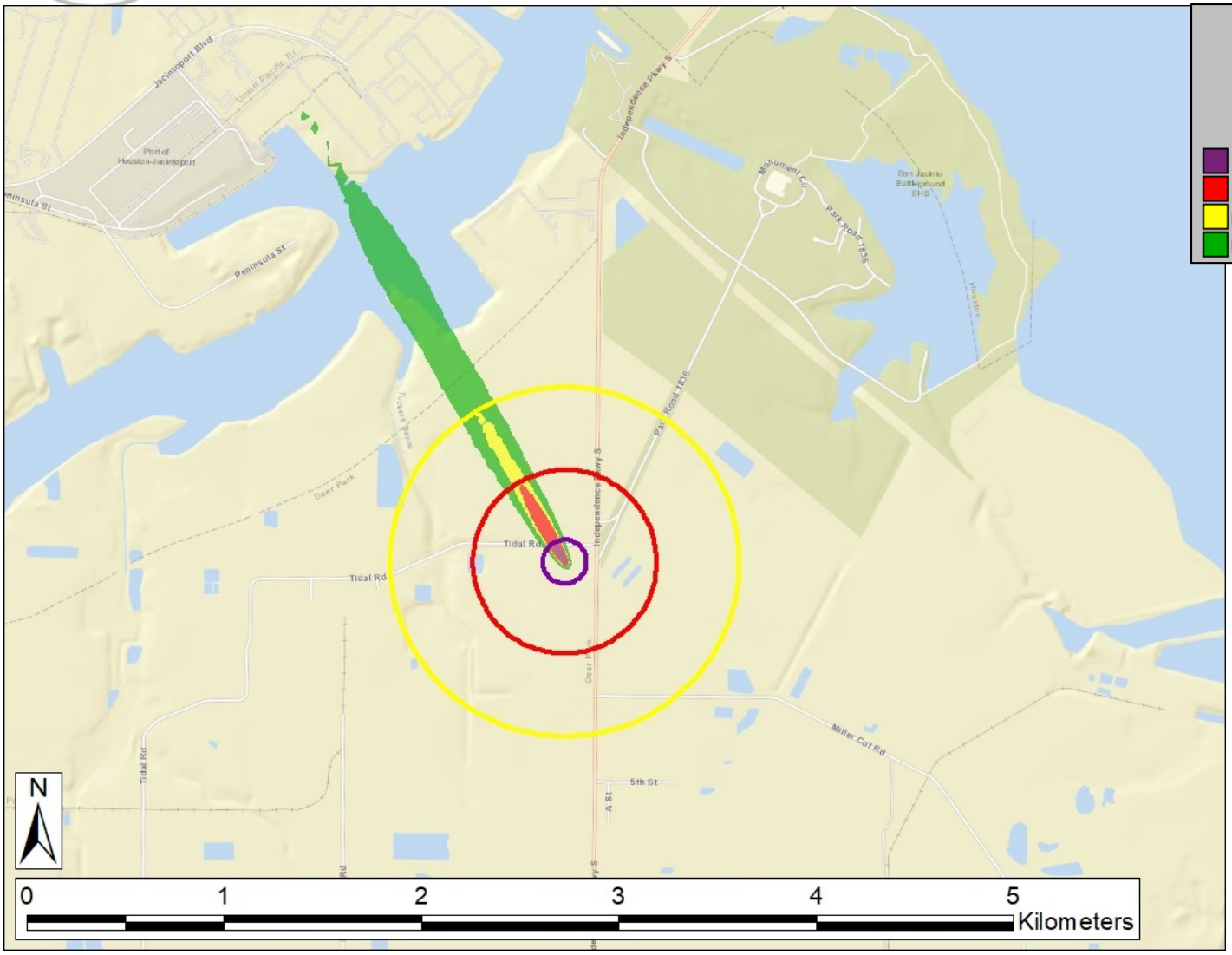
AEGLs:
- High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
- Initialized: 00Z 29MAR2019

AEGL Effects; 2200 CDT 28-MAR – 0600 CDT 29-MAR

FACTS

Deer Park, TX
Location: 29.732437° N / 95.091517° W
Event Time: 2200 CDT, 28MAR2019
Type: Benzene
Amount: 30 kg/min
Weather: 12 km NAM
Model: HPAC 6.5
Static Population Estimates:
LandScan 2017

Benzene – Tank Farm, 12 hours, Far View



Benzene(Total) Concentration 30-Mar-19 07:00:00Z (12.000 hr)	kg/m3	In contour population
10 ppm	3.19E-05	0
1 ppm	3.19E-06	20
0.5 ppm	1.595E-06	52
0.1 ppm	3.19E-07	227

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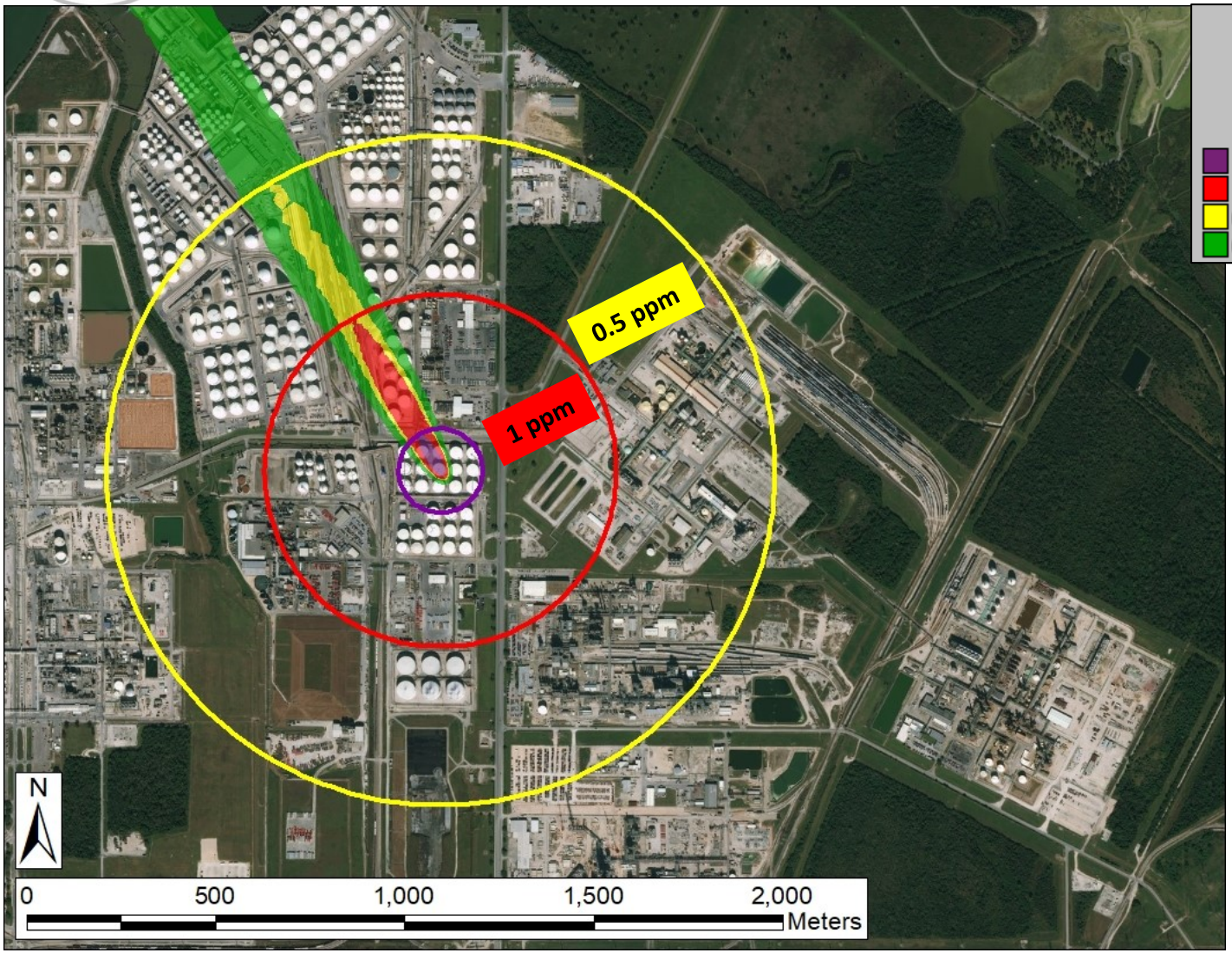
Model: HPAC 6.5

Static Population Estimates: LandScan 2017

Benzene – Tank Farm, 12 hours, Near View



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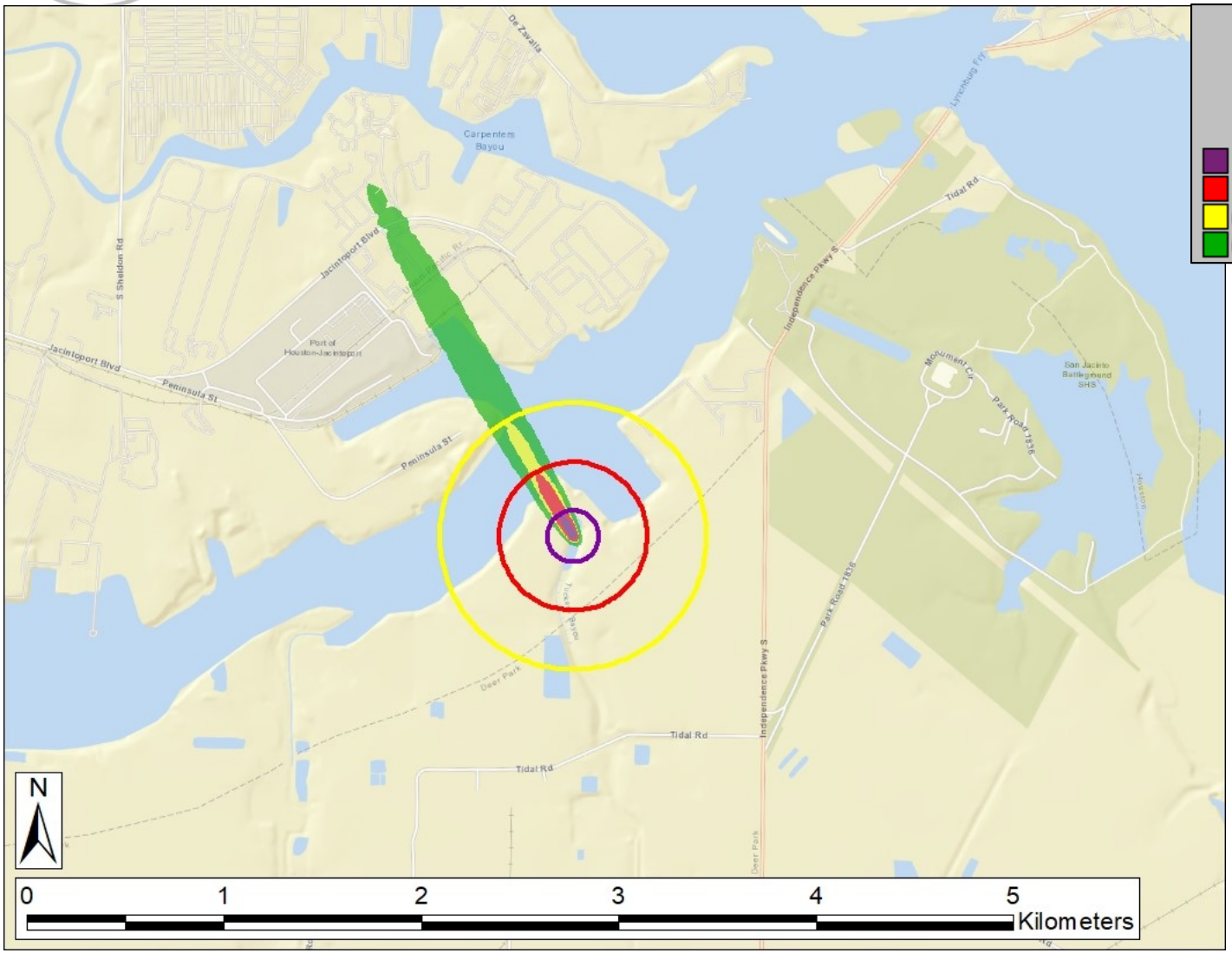

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0.5 ppm	1.595E-06	6
0.1 ppm	3.19E-07	96

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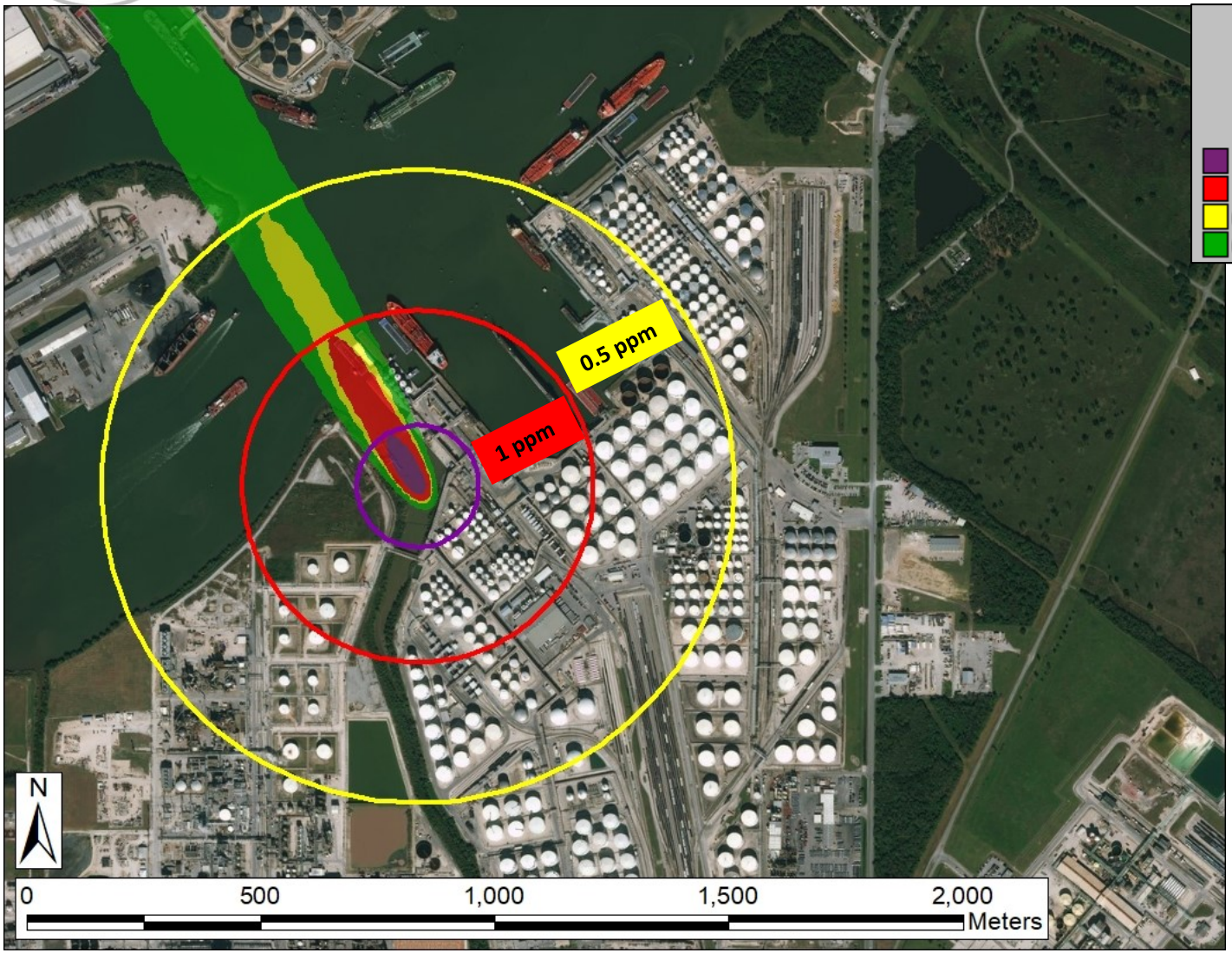

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Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible -** the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible -** the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold -** the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGLs represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. It is believed that the recommended exposure levels are applicable to the general population including infants and children, and other individuals who may be susceptible.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.
INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

Notes: Casualty numerical figures are based upon a population database (LandScan). LandScan is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data and was updated in 2017. The population numbers next to associated hazard levels are the people contained within the entire contour based **upon average day and night** time LandScan 2017 data. **Also available are the average day or night** time LandScan 2016 data (US only). For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas. The population data will not predict major shifts in personnel such as relocations (i.e.: religious pilgrimages, refuges, evacuations), events (i.e.: inaugurations, Olympics), or other population shifts. In such cases the population database needs to be updated to reflect actual conditions.